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2014 Rabies Activity Year End Summary

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Executive Summary

The Arkansas Department of Health (ADH) received 1,355 specimens for rabies testing in 2014, of which 151 specimens tested positive for rabies from Arkansas submissions (11% of submitted specimens). The mean number of positive rabies from 1990-2014 is 58 (min. 29, max. 152). Specimens received also included 14 animal specimens from other states (Missouri-2, Oklahoma-2, and Texas-10), as well as 10 proficiency samples. Wild animals accounted for approximately 96% positive tested animals in 2014, in Arkansas, which is slightly higher than the national average of 92% reported to CDC in 2013.

There were eight separate occasions that humans were exposed to known rabid animals in 2014. ADH recommended that 21 people receive post exposure prophylaxis (PEP) because of those exposures. Two additional people chose to take the PEP as a precaution, even though their interaction with rabid animals were not categorized as an exposure.

The positive results for Arkansas submissions included 34 bats, three cats, three cows, one dog, one fox, and 109 skunks (Table 1). Rabies specimens were submitted from 71 counties, with positive results in 35 counties, which represent all five public health regions. The occurrence of rabies positive specimens was January through December, peaking March through April.

Central Arkansas continued to see terrestrial rabies in areas that historically have not had documented cases. Pulaski County submitted the most specimens of any county in 2014 with 285 specimens submitted for testing. Of the specimens submitted from Pulaski County, 31 were positive (10.9% positive), including 21 skunks, eight bats, one cow, and one cat. Pulaski County had not had positive specimens from terrestrial animals from approximately 1980 until 2013. Lonoke County, directly east of Pulaski County, submitted 46 specimens for testing, with fifteen positive (32.6%), including 14 skunks and one fox, which exceeds the total number of positives for Lonoke County from 1990 to 2013.

Animals testing positive for rabies in 2014 exposed approximately 273 domestic animals, including 150 dogs, 51 cats, and 72 cattle. The State Public Health Veterinarian and the Zoonotic Epidemiologist coordinated positive rabies follow-up, including the quarantines for domestic animals and the risk assessment of people exposed to rabid animals. The State Public Health Veterinarian coordinated the recommendation for PEP. Thirty-eight ADH Environmental Health Specialists (EHS) conducted quarantine monitoring in 60 instances of exposures throughout the year.

Data Limitations

The data collected on rabies is from a passive surveillance system. The data is dependent on informed veterinarians, animal control officers, and citizens submitting specimens of suspect animals. Surveillance is incomplete, and the incidence of rabies is underestimated. Increased awareness following public notification of positive results increases specimen submission, thereby increasing the sample size for testing.

Table 1 Animals tested for rabies, AR 2014

Animal type	Positive	Received*	% Positive	AR Positive Rabies/Year		
				Year	Positive	% Positive
Bat	34	254	13			
Skunk	109	224	49	2014	151	11
Cat	3	306	1	2013	152	12
Dog	1	377	< 1	2012	131	11
Fox	1	11	9	2011	60	7
Cow	3	31	10	2010	34	4
Raccoon	0	63	0	2009	47	5
Other animals [±]	0	65	0	2008	49	5
Arkansas Total	151	1331	11	2007	33	4
Other States [†]	2	14	14	2006	34	4
Proficiency Tests	3	10	30	2005	36	4
Total All Specimens	156	1355	12	2004	55	5

* Includes specimens determined unsatisfactory for testing.

[±] Includes chipmunk (1), coyote (1), deer (1), donkey (2), gerbil (1), goat (7), groundhog (6), horse (12), mole (1), mouse (3), opossum (9), rabbit (3), rat (3), squirrel (13), swine (2).

[†] Includes a positive from Texas (1 bat) and one positive from Oklahoma (1 skunk), along with other submissions from Texas (10), Missouri (2) and Oklahoma (2)

National Information

Over the last 100 years, rabies in the United States has changed dramatically. More than 90% of all animal cases reported annually to CDC now occur in wildlife; before 1960, the majority was in domestic animals. The principal rabies hosts today are wild carnivores and bats. All mammals are believed to be susceptible to infection, but major reservoirs are carnivores and bats. Although dogs are the main reservoir in developing countries, the epidemiology of the disease from one region or country to another differs enough to warrant the medical evaluation of all mammal bites. Bat bites anywhere in the world are a cause of concern and an indication for prophylaxis (JAVMA, 2014).

Reporting and Analysis

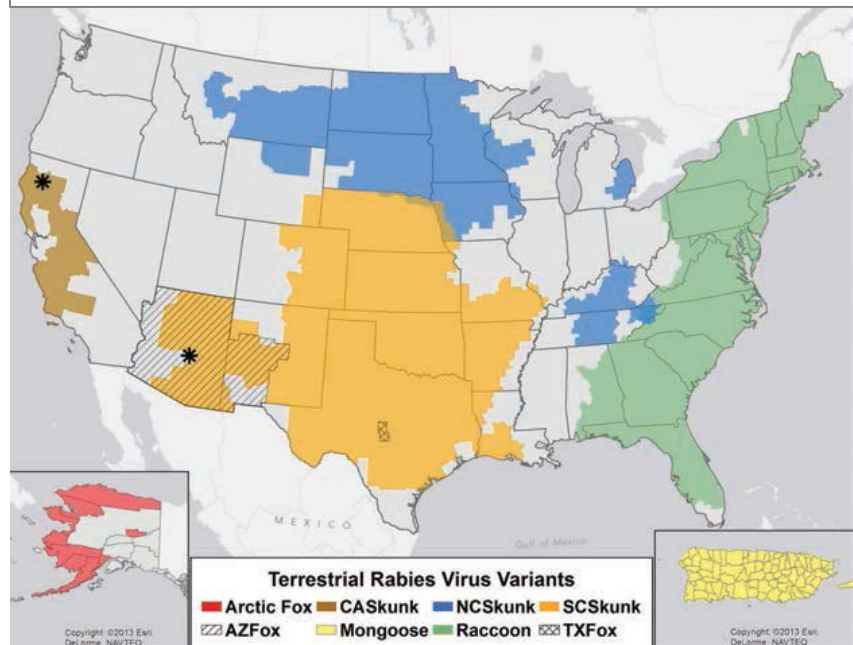
Human and animal rabies are nationally notifiable conditions in the United States. Animal rabies surveillance is laboratory based, comprising 126 state health, agriculture, and university pathology laboratories performing the standard direct fluorescent antibody test for rabies diagnosis. During 2013, 53 reporting jurisdictions reported 5,865 rabid animals and three human rabies cases to the CDC, representing a 4.8% decrease from the 6,162 rabid animals and one human case reported in 2012. Ninety-two percent of reported rabid animals were wildlife. The CDC rabies program requests detailed information on animals submitted for rabies testing, as described. All states, with the exception of California, provided data on species, county, and date of testing or specimen collection for all animals submitted for rabies testing. Arkansas and eight other states (Idaho, Maryland, Massachusetts, Minnesota, New Jersey, South Dakota, Virginia, and West Virginia) transmitted electronic laboratory data for rabies diagnostic activity primarily through the Public Health Laboratory Information System.

Natural Reservoirs

Wild animals account for approximately 92% of the rabid animals reported in 2013 in the United States.

Figure 1 shows the distribution of major rabies virus variants in the United States from 2009 to 2013. Nationally, there was a decrease of 4.3% reported rabid wild animals from 2012. The wild animals reported (in order of decreasing frequency) with rabies were raccoons, skunks, foxes, bats, and other wild animals such as coyotes, bobcats, groundhogs and beaver. Seasonal trends for wild animals testing positive for rabies showed peaks in numbers in March to May, and again in September (1).

Figure 1 Distribution of major rabies virus variants, U.S. and Puerto Rico, 2009-2013



Domestic Animals

Domestic animals accounted for approximately 8% of all rabid animals reported in 2013, a decrease from 10% of domestic animals, compared with the number reported during 2012. Cats have represented the majority of rabid domestic animals since 1992 (1). The domestic animals reported (in order of increasing frequency) with rabies were sheep and goats, horses and mules, dogs, cattle, and cats. In 2007, the United States was declared free of the canine variant of rabies, which means there no longer is dog-to-dog transmission of rabies in our country. This was achieved through implementation of dog vaccination and licensing, and stray dog control. This current canine-free status is fragile and highlights the need to continue rabies prevention, control and surveillance.

Human Rabies in the United States

Twenty-four states submitted a total of 42 human specimens for testing, with three human cases of rabies in the US in 2013. A total of 34 human cases have been diagnosed since 2003. Of those 34 cases, 10 were infected outside of the US and 24 of the patients acquired rabies domestically. Of the domestically acquired cases in this timeframe, 63 percent of those cases were related to a bat exposure (either bitten or close contact), with three infected with known bat variant, two related to the raccoon variant, one with the mongoose variant in Puerto Rico, and one with unknown variant of rabies. Five cases were attributed to organ or tissue transplantation.

In 2014, one human case of rabies was reported in the United States. The case occurred in September of 2014 in Miller County Missouri, and was fatal. The Missouri Department of Health and Senior Services contacted ADH on September 29, 2014 with information that the Missouri rabies case may have

had contact with two Independence County Arkansas residents. ADH interviewed the potential contacts and determined there was no risk of transmission.

Rabies in Canada and Mexico

Canada reported 92 laboratory-confirmed rabid animals during 2014. Wildlife was the most common rabid animals, representing 88 percent all rabid animals.

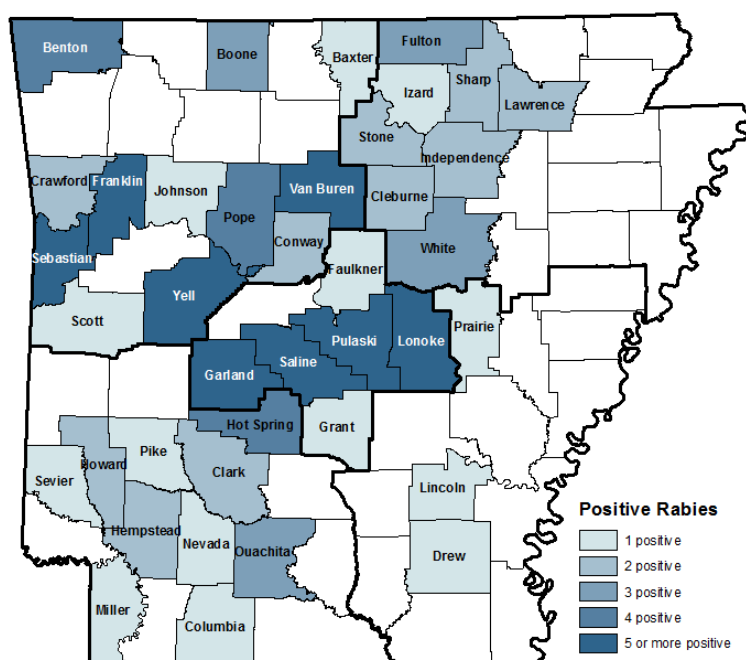
No human deaths associated with rabies were reported in Mexico during 2013 (first time since 1938), which is the latest year available for Mexico. Eleven rabid dogs were reported in 2013, representing an eight percent decrease from the 12 reported in 2012.

Arkansas Information and Rabies Activity 2014

The Arkansas Department of Health (ADH) received 1,355 specimens for rabies testing (1331 from Arkansas) in 2014, of which 151 specimens tested positive for rabies from Arkansas submissions (11.3% of submitted specimens). The mean number of positive rabies from 1990-2014 is 47 (min. 29, max. 152). Wild animals accounted for approximately 96% positive tested animals in 2014 in Arkansas, which is slightly higher than the national average of 92% reported to CDC in 2013 (JAVMA, 2015).

The positive results included 109 skunks, 34 bats, one dog, three cats, three cattle, and one fox (Table 1). Rabies specimens were submitted from 72 counties, with positive results in 38 counties, which represent all five public health regions (Figure 2). The occurrence of rabies positive specimens was January through December, with bimodal peaks in April and September.

Figure 2 Counties with confirmed rabies, AR 2014



The Arkansas Department of Health Laboratory received specimens from seven other states for rabies testing; Table 2 provides information on Rabies specimen submission by state in 2014.

Table 2. Rabies specimen submission by state, AR 2014

State	Animal	Positive	Negative	Not Tested	Total Submitted	Positive Rate %
Arkansas	Bat	34	207	13	254	13
	Cat	3	298	5	306	1
	Chipmunk		1		1	0
	Cow	3	28		31	10
	Coyote		1		1	0
	Deer		1		1	0
	Dog	1	367	9	377	0
	Donkey		2		2	0
	Fox	1	10		11	9
	Gerbil		1		1	0
	Goat		7		7	0
	Ground hog		6		6	0
	Horse		12		12	0
	Mole		1		1	0
	Mouse		3		3	0
	Opossum		7	2	9	0
	Rabbit		2	1	3	0
	Raccoon		61	2	63	0
	Rat		2	1	3	0
	Skunk	109	106	9	224	49
	Squirrel		12	1	13	0
	Swine		2		2	0
AR Total		151	1137	43	1331	11
Missouri	Dog		1		1	0
	Raccoon		1		1	0
MO Total			2		2	0
Oklahoma	Dog		1		1	0
	Skunk	1			1	100
OK Total		1	1		2	50
Texas	Bat	1	1		2	50
	Cat		1		1	0
	Dog		4		4	0
	Horse		2		2	0
	Raccoon		1		1	0
TX Total		1	9		10	10
Grand Total		153	1149	43	1345	11

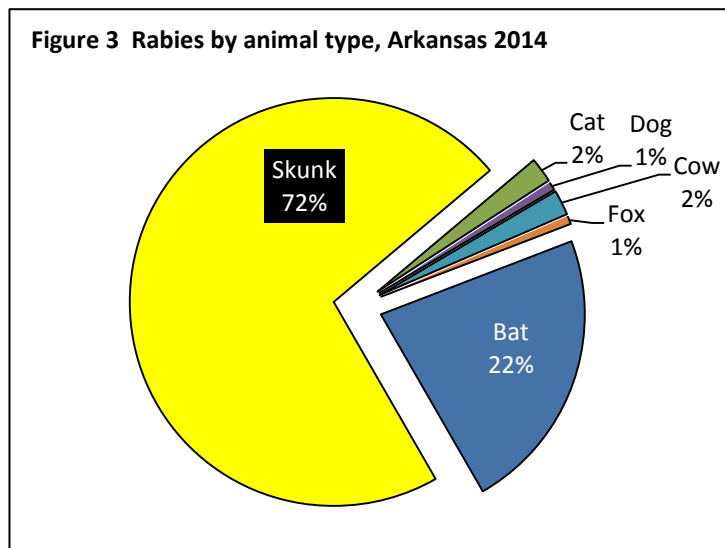
There were at least 273 domestic animals known to have been exposed to rabies in Arkansas in 2014. Of those animals exposed, 150 were dogs, 51 cats, and 72 cattle. More than 80 animals were known to be euthanized in 19 separate instances of exposure.

The State Public Health Veterinarian and the Zoonotic Epidemiologist coordinated all instances of positive rabies follow-up including the coordination of quarantines for domestic animals. The

determination of risk of humans exposed to rabid animals and the recommendation for post exposure prophylaxis was also coordinated by the State Public Health Veterinarian. ADH Environmental Health Specialists (EHS) conducted quarantine monitoring in 61 instances of exposure throughout the year. There were 20 quarantines in the Central public health region, 22 in the Northwest Public Health Region, 12 in the Northeast Public Health Region, one in the Southeast Public Health Region, and six in the Southwest Public Health Region.

All known exposed domestic animals were categorized regarding their rabies vaccinations:

- Current as documented by a licensed veterinarian for the dogs and cats (as required by state law)
- Out-of-date or vaccinated with an over-the-counter vaccine (OTC), i.e. having some previous rabies vaccine in the past
- Never vaccinated



The animals identified as potentially exposed to rabies included 150 dogs, of which 49 were current on vaccinations (32.7%), 37 were either out of date or had an OTC vaccine (24.7%), and 64 had never been vaccinated (42.7%). Of the dogs that were identified at risk, 37 (24.7%) were euthanized. Fifty-one cats that were identified at risk, only five were current on vaccinations (9.8%), and the remainder, 46 had never been vaccinated (90.2%). Of the cats that were identified at risk, 45 (88.2%) were euthanized. Seventy-two cattle were identified at risk, none of which were previously vaccinated. All cattle were monitored under quarantine, and eventually released.

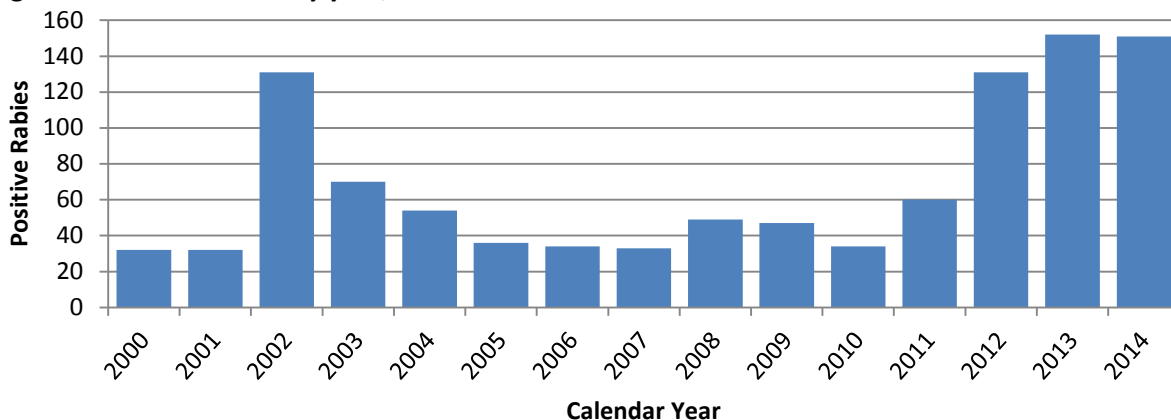
The testing of rabies is dependent on the voluntary submission of specimens by the public. Increased awareness following public notification of positive results increases specimen submission, thereby increasing the sample size for testing. Following a press release about increased rabies in an area, submissions of rabies suspect animals increase regularly, and hence more positives are discovered.

Comparison to Previous Years

Wild animals accounted for approximately 94% positive tested animals, which is slightly higher than the national average of 92%. Skunks accounted for 72% of all wild animals positive for rabies 2014 (Figure 3).

Positive rabies in 2014 was at the second highest level in recent Arkansas history (Figure 4). Positive results for rabies occurred throughout the calendar year, peaking March through April (Figure 7).

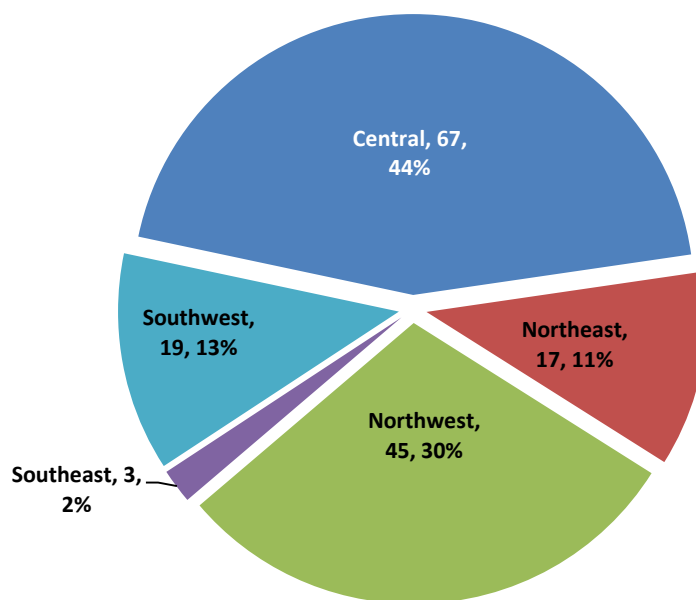
Figure 4. Positive rabies by year, AR 2000-2014



Geographic Distribution of Rabies

The occurrence of rabies in Arkansas is not equally distributed across the state. Most of the rabies in Arkansas historically has occurred in the northwest portion of the state. In 2014 the majority (67%) of positive rabies occurred in the Central public health region (Figure 5) along with 43 percent of all monitored quarantine activities. Central Arkansas continued to see terrestrial rabies in areas that historically have not had documented cases. Pulaski County submitted the most specimens of any county in 2014 with 285 specimens submitted for testing. Of the specimens submitted from Pulaski County, 31 were positive (10.9% positive), including 21 skunks, eight bats, and one cat.

Figure 5. Rabies by public health region, AR 2014



Pulaski County had not had positive specimens from terrestrial animals from approximately 1980 until 2013. Lonoke County, directly east of Pulaski County, submitted 46 specimens for testing, with fifteen positive (32.6%), including 14 skunks and one fox, which exceeds the total number of positives for Lonoke County from 1990 to 2013.

Historically, seven counties in Arkansas (Ashley, Bradley, Crittenden, Cross, Lee, Mississippi, and Poinsett) have not had any positive rabies 1990-2014 (Figure 6). In 2014 Lincoln County recorded their first positive rabies, a bat. Those counties, located on the eastern and southeastern portion of the state, traditionally also have very low submission rates as well.

Submission of specimens is a passive surveillance system and a possible complicating factor could be low submissions from these counties. Table 3 provides a summary of positive rabies by public health region and county in Arkansas in 2014. Figure 7 represents positive rabies by month.

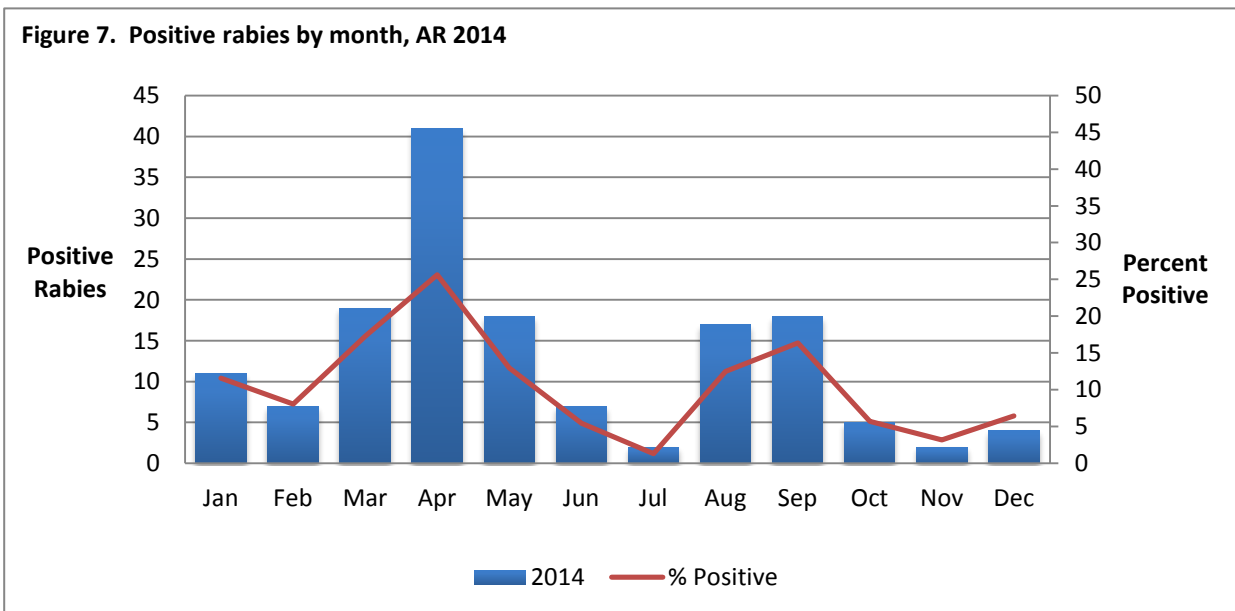
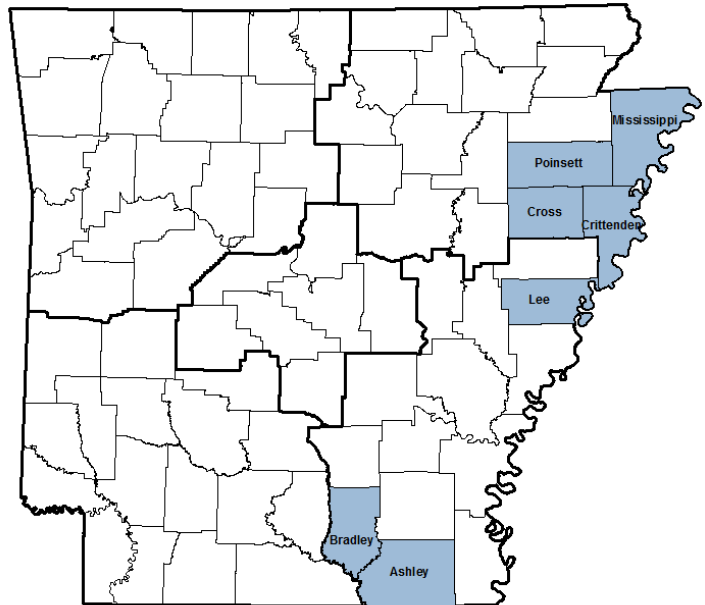


Table 3. Positive rabies by public health region and county, Arkansas 2014

Public Health Region	County	Bat	Cat	Cow	Dog	Fox	Skunk	Total
Central Public Health Region	Faulkner						1	1
	Garland	7					6	13
	Grant						1	1
	Lonoke					1	14	14
	Pulaski	8	1	1			21	31
	Saline	3					4	7
Northeast Public Health Region	Cleburne		1				1	2
	Fulton		1				2	3
	Independence						2	2
	Izard						1	1
	Lawrence	1					1	2
	Sharp						2	2
	Stone						2	2
	White			1			2	3
Northwest Public Health Region	Baxter						1	1
	Benton						4	4
	Boone						3	3
	Conway	1			1			2
	Crawford	2						2
	Franklin	1					5	6
	Johnson						1	1
	Pope						4	4
	Scott						1	1
	Sebastian						5	5
	Van Buren	2					3	5
	Yell	1					10	11
Southeast Public Health Region	Drew	1						1
	Lincoln	1						1
	Prairie			1				1
Southwest Public Health Region	Clark	1					1	2
	Columbia						1	1
	Hempstead						2	2
	Hot Spring	2					2	4
	Howard						2	2
	Miller						1	2
	Nevada						1	1
	Ouachita	3						3
	Pike						1	1
	Sevier						1	1
Statewide Total		34	3	3	1	1	109	151

Positive Rabies Analysis by Animal Type: Skunks

The number of positive rabies in skunks reported to the Arkansas Department of Health in 2014 decreased from 118 positives in 2013,

to 109 positive in 2014. Rabies was confirmed in skunks in 30 counties (Figure 8). The mean number of cases reported from 2000-2013 is 48 (range 15 to 118) (Figure 9).

- Two hundred and twenty-four skunks were submitted for testing in 2014, with 109 positive (positivity rate of 49%). The number of positive skunks in 2014 is the second highest number of positive skunks in recent history.
- Two people were identified as having a potential exposure to rabid skunks in 2014. Both individuals received rabies Post Exposure Prophylaxis (PEP), following recommendations of the State Public Health Veterinarian.

Figure 8. Counties with positive rabies in skunks, AR 2014

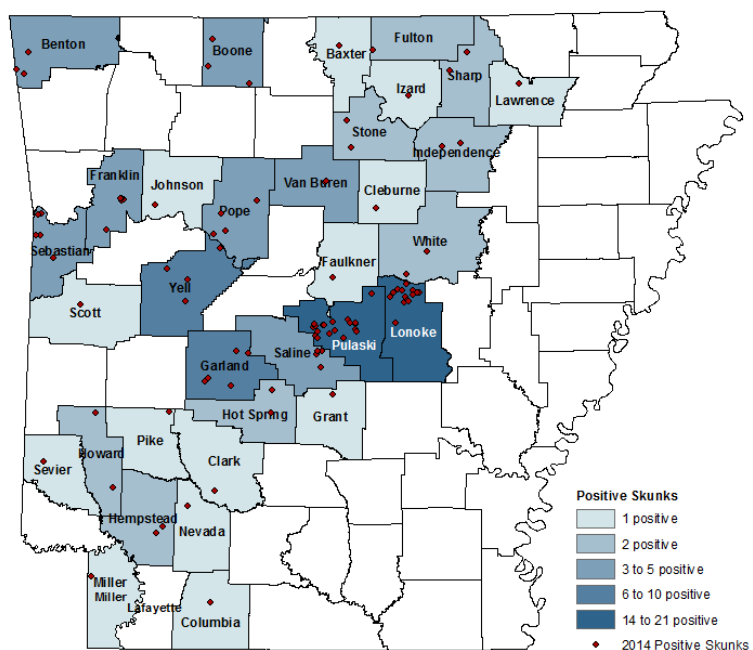
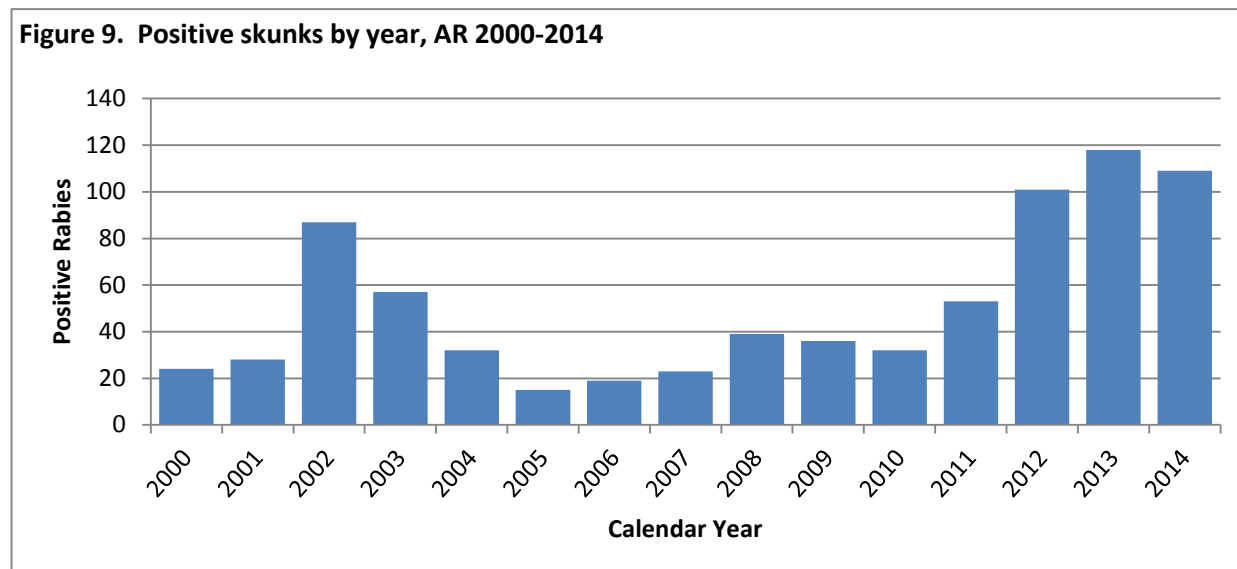


Figure 9. Positive skunks by year, AR 2000-2014



Positive Rabies Analysis by Animal Type: Bats

The number of positive rabies in bats reported to the Arkansas Department of Health in 2013 increased from 26 positives in 2013, to 34 positives in 2014. Rabies was confirmed in bats in 13 counties (Figure 10). The mean number of cases reported from 2000 to 2014 is 14 (range 1 to 35) (Figure 11).

- Two hundred and fifty-four bats were submitted for testing in 2014, with 34 positive (positivity rate of 13%). This represents a ten year high for positive bats.

Figure 10. Counties with positive rabies in bats, AR 2014

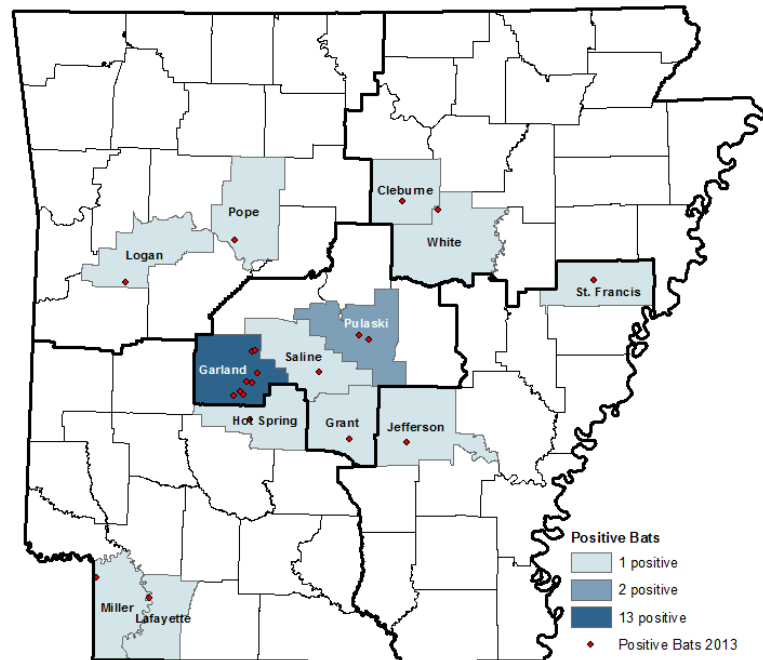
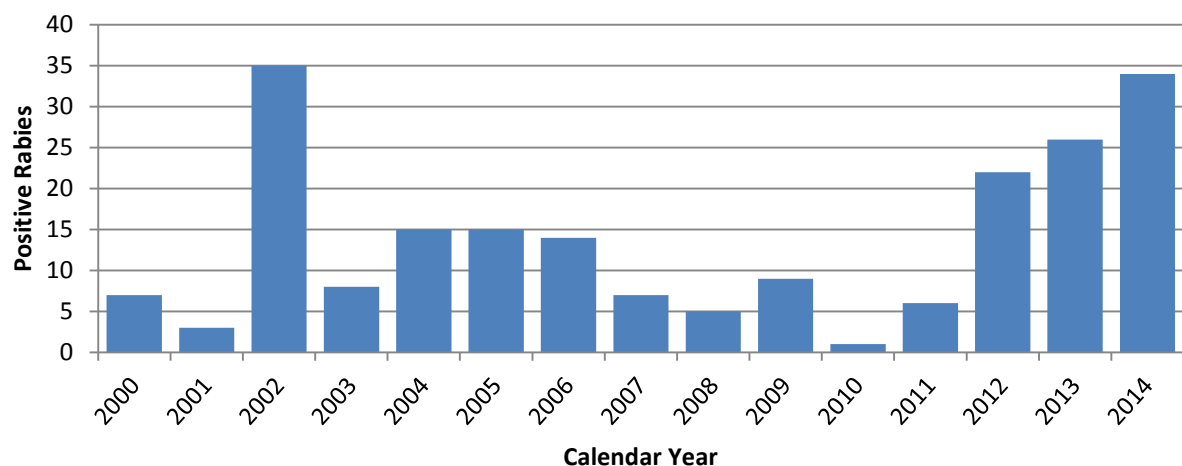


Figure 11. Positive bats by year, AR 2000-2014



Positive Rabies Analysis by Animal Type: Dogs

The number of positive rabies in dogs reported to the Arkansas Department of Health in 2014 decreased from 2013. Rabies was confirmed in one dog (Figure 12). The mean number of cases reported from 2000 to 2014 is 2 (range 0 to 5) Figure

13).

- Three hundred and seventy-seven dogs were submitted for testing in 2014, with one positive (positivity rate of <1%).
- One hundred and fifty domestic dogs were known to be exposed to rabies by other animals, 49 of which were current on rabies vaccination. The rabies vaccination rate of exposed dogs was approximately 33 percent.
- Four people were exposed to the rabid dog in 2014, all of whom received rabies PEP, following recommendations of the State Public Health Veterinarian.
- *It is important to note that domestic animals with rabies historically expose a much larger human population than wild animals.*

Figure 12. Counties with positive rabies in dogs, AR 2014

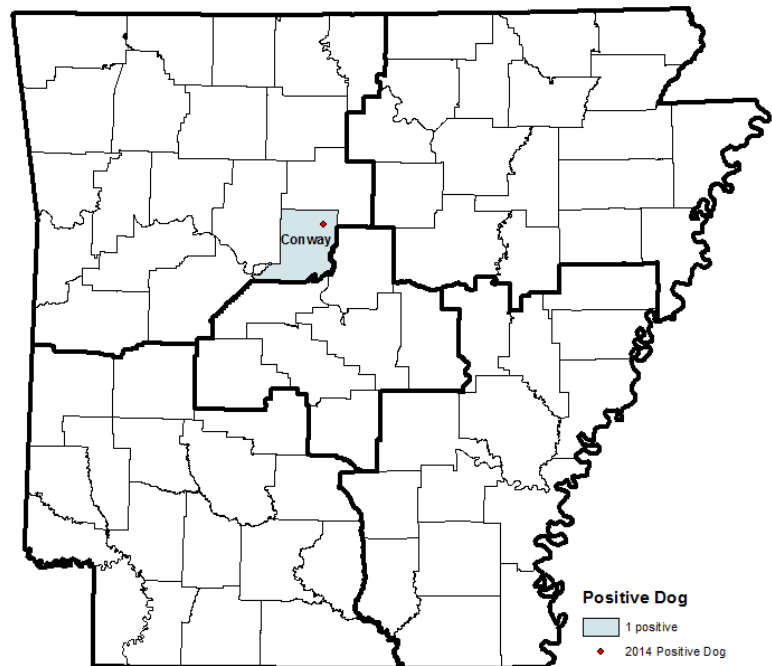
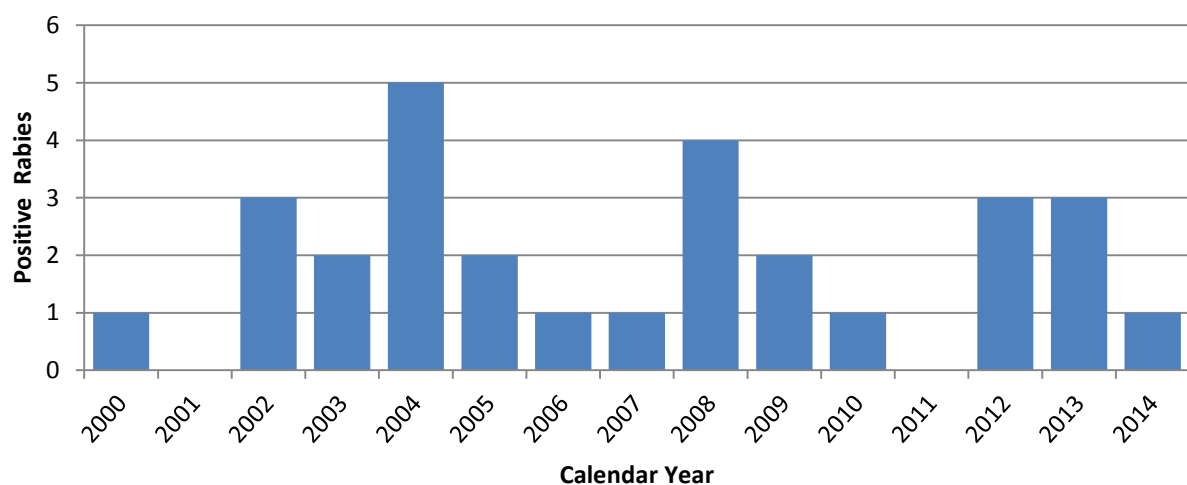


Figure 13. Positive dogs by year, AR 2000-2014



Positive Rabies Analysis by Animal Type: Cats

The number of positive rabies in cats reported to the Arkansas Department of Health in 2014 was three, the same as 2013 (Figure 14). The mean number of cases reported from 2000 to 2014 is one (range 0 to 3) (Figure 15).

- Three hundred and twenty seven cats were submitted for testing in 2014, with three positive (positivity rate of <1%).
- Twenty-six domestic cats were known to be exposed to rabies by other animals. None of the exposed cats were vaccinated for rabies.
- Fifteen people were exposed to rabid cats in 2014, all of which received rabies PEP, following recommendations of the State Public Health Veterinarian.
- *It is important to note that domestic animals with rabies historically expose a much larger human population than wild animals.*

Figure 14. Counties with positive rabies in cats, AR 2014

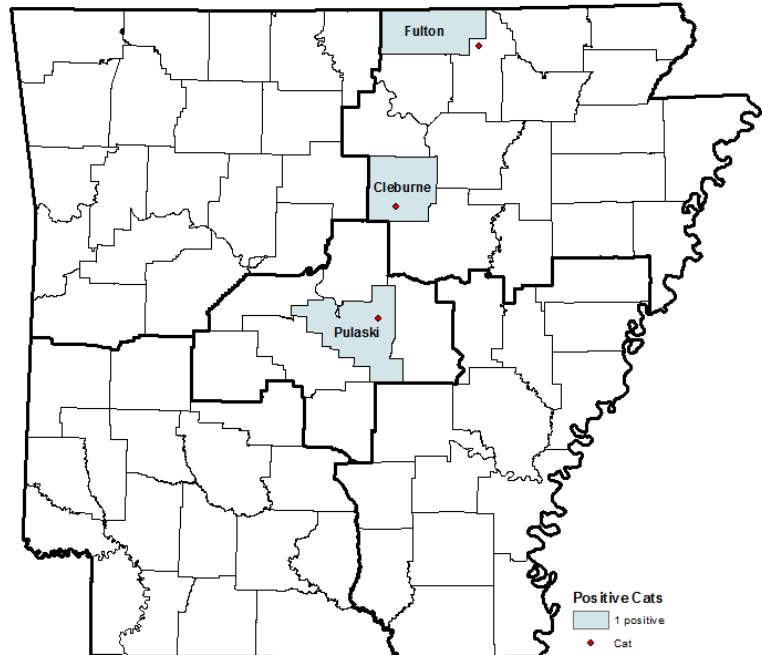
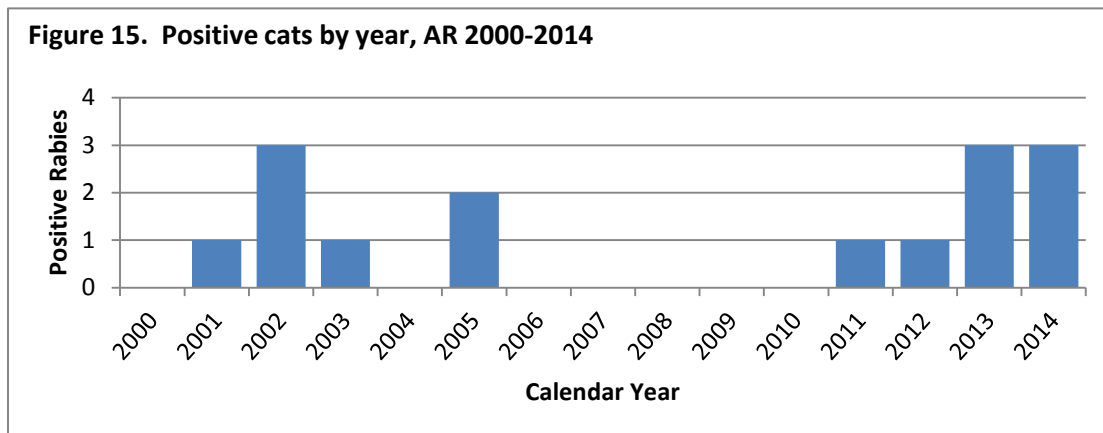


Figure 15. Positive cats by year, AR 2000-2014



Positive Rabies Analysis by Animal Type: Cattle

The number of positive rabies in cattle reported to the Arkansas Department of Health in 2014 was three, up from the one case in 2013. Rabies was confirmed in cows in White, Prairie, and Pulaski Counties (Figure 16). The mean number of cases reported from 2000 to 2013 is one (range 0 to 3) (Figure 17).

- Thirty-one cattle were submitted for testing in 2014, with three positives (positivity rate of 10%). Seventy-two additional cattle were suspected to be exposed to rabies by other animals in Franklin, Saline, and Yell Counties. None of the exposed cattle were vaccinated for rabies.
- Thirteen people were exposed to the rabid cattle, all of which received rabies PEP, following recommendations of the State Public Health Veterinarian. Two additional people sought PEP as a precaution.
- It is important to note that domestic animals with rabies historically expose a much larger human population than wild animals.

Figure 16. Counties with positive rabies in cattle, AR 2014

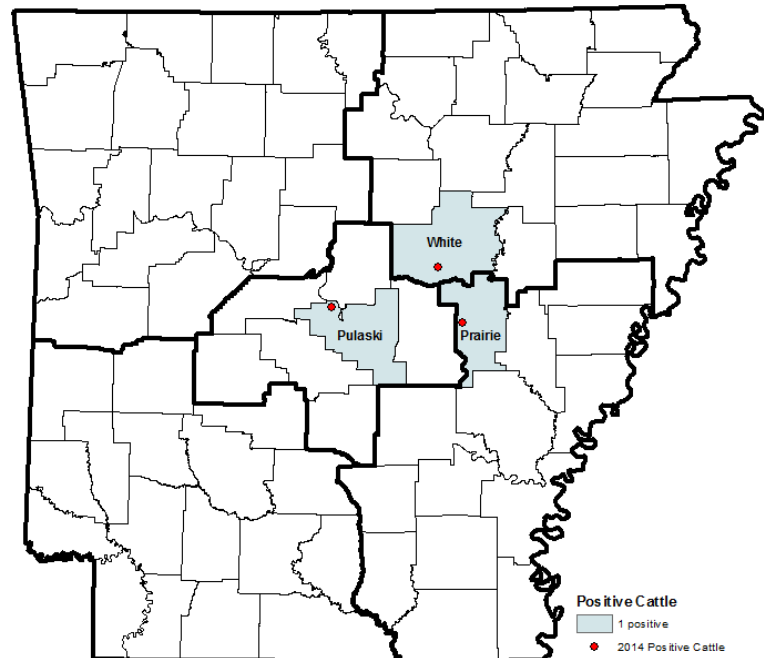
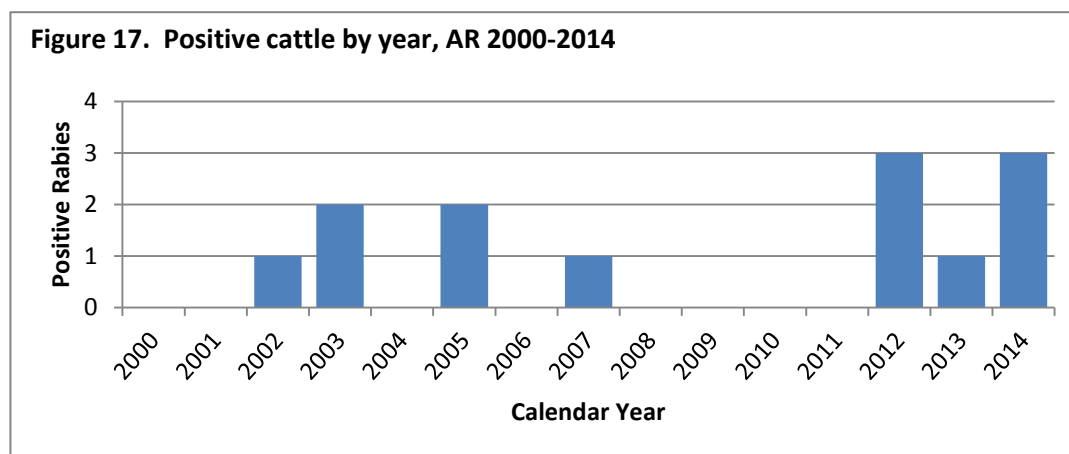


Figure 17. Positive cattle by year, AR 2000-2014



Positive Rabies Analysis by Animal Type: Fox

The number of positive rabies in foxes reported to the Arkansas Department of Health in 2014 increased from 2013 with one positive. (Figure 18). Prior to 2014, the most recent positive fox with rabies was in 2007. The mean number of cases reported from 2000 to 2014 is less than one (range 0 to 2) (Figure 19).

- Eleven foxes were submitted for testing in 2014, with one positive (positivity rate of 9%).
- Two dogs were identified as being potentially exposed to the rabid fox.
- Arkansas has not identified fox variant in the past; the fox specimen will be submitted for typing to determine the variant. We fully expect it to be skunk variant.

Figure 18. Counties with positive rabies in a Fox, AR 2014

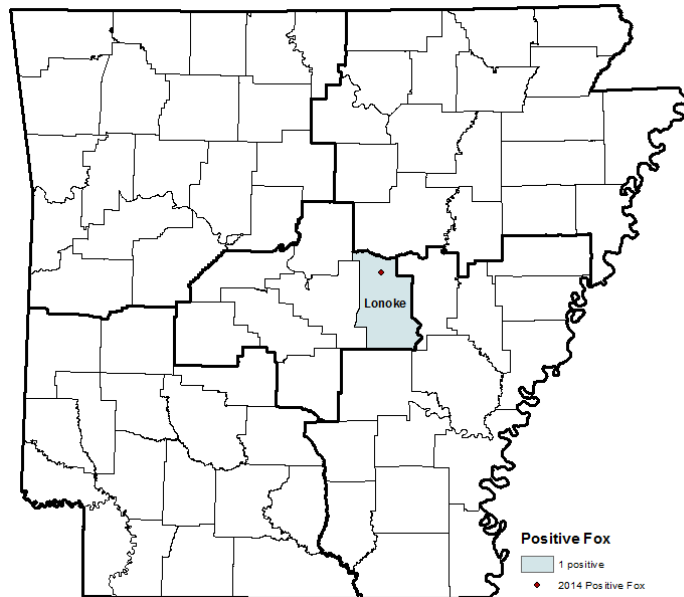


Figure 19. Positive foxes by year, AR 2000-2014

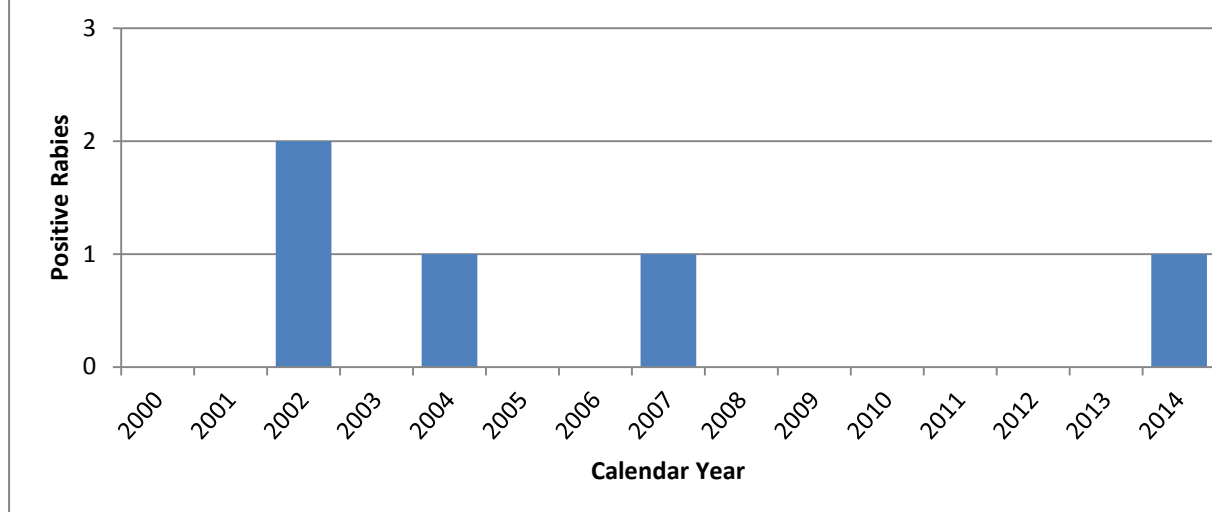


Figure 20. Positive rabies in Arkansas, 2014

